

Chapter 1

Introduction to Volume 2

1.1 Overview of Volumes 1 and 2

This document is the second in a two-volume series addressing wetlands in Washington and their management and protection. The first volume, *Freshwater Wetlands in Washington State, Volume 1: A Synthesis of the Science* (Sheldon et al. 2003), is a synthesis of the most current science and was released in draft form to the public in the fall of 2003. All of the comments received on Volume 1, as well as a 16-page summary of the comments with responses, have been posted on the project's web page: http://www.ecy.wa.gov/programs/sea/bas_wetlands/index.html. Volume 1 will be finalized during the fall of 2004.

Volume 1 synthesized the literature regarding:

- Freshwater wetlands in Washington and how they function;
- The effects of human activities on Washington's freshwater wetlands and their functions; and
- The tools used to protect and manage freshwater wetlands and their functions and values.

The key conclusions from Volume 1 are summarized in Chapter 3 in this document.

Volume 2 contains draft guidance for local governments on managing and protecting wetlands and their functions based on the synthesis of the science in Volume 1. Although the focus is local governments, the information contained in this document should be useful to anyone who has an interest in the protection and management of wetlands in the state.

The key themes or messages in Volume 2 are as follows:

- By relying on a site-by-site approach to managing wetlands, we are failing to effectively protect them;
- To effectively protect wetlands and their functions, we also must understand and manage their interaction with the environmental factors that control wetland functions;
- To understand and manage these environmental factors and wetland functions, information generated through landscape analysis is needed and should be used in developing measures to manage and protect wetlands and their functions;

- Protection and management measures should incorporate a full range of components including:
 - Policies and plans such as comprehensive plans, subarea plans, Green Infrastructure plans, etc.;
 - Regulations such as critical areas ordinances, clearing and grading ordinances, etc.; and
 - Non-regulatory programs to restore and preserve using voluntary efforts and incentives that encourage conservation.

1.2 Purpose and Goals of Volume 2

Both Volumes 1 and 2 were written to assist local governments in complying with requirements in the Growth Management Act (GMA) to include the best available science when adopting development regulations to designate and protect critical areas, including wetlands. The GMA requires that local governments protect wetland functions and values, and evaluate and include relevant scientific information in determining what policies, plans, and regulations are needed. (See Chapter 2 for a discussion of the relevant mandates in the Growth Management Act.)

This is a challenging task and one that some cities and counties are poorly equipped to undertake. Many local governments have asked our departments to assist them by providing both general guidance and specific recommended code language for protecting wetlands.

The options and recommendations presented in Volume 2 are advisory only. Local governments are not required to use this guidance. The information presented in this document is not, in and of itself, the “best available science.” Rather, it represents the recommendations of the Departments of Ecology and Fish and Wildlife as to how a local government could incorporate the best available science into policies, plans, and regulations to protect wetlands.

Volume 2 was also written to address the fact that wetlands continue to be lost and degraded through human activities in spite of the adoption of “no-net-loss” policies at local, state, and federal levels and an increased knowledge of the complex processes that drive wetland functions. The results of the scientific research synthesized in Volume 1 are clear: We have not stopped the continued degradation of our wetlands and their functions (Sheldon et al. 2003).

As concluded in Volume 1, wetland losses often result from a combination of impacts from human activities that occur both within and outside individual wetlands. Changes from human activities result in cumulative impacts across the landscape. Currently, however, the majority of decisions about managing wetlands in Washington State fail to consider environmental factors that control wetland functions or consequences of human

actions that occur at a landscape scale; they are made on a case-by-case basis related to specific projects.

The Departments' goals for Volume 2, therefore, are to help local governments:

- Use current scientific information to inform their decisions about the protection and management of wetlands and their functions and values to meet the requirements of the GMA; and
- Incorporate a more holistic, landscape-based approach to better protect wetlands and their functions and values and to manage cumulative effects.

The primary objective of Volume 2 is to translate the science synthesized in Volume 1 into recommendations and, where possible, several options for protecting and managing wetlands using landscape analysis, processes for planning, regulatory options, and sample code language, as well as non-regulatory approaches. For example, three different alternatives for buffer widths are provided, one being a matrix using factors such as wetland rating, intensity of effects from the proposed activity, wetland functions and other characteristics. Such approaches allow more flexibility.

In the future, it is hoped that:

- The protection and management of wetlands will be integrated with the management of all environmental resources across the landscape;
- Impacts to wetland functions and values from decisions about land uses will be understood at the appropriate geographic scales;
- Local jurisdictions will plan for future development in a proactive manner so impacts to the environmental factors that control functions are minimized before they occur; and
- When tradeoffs between conflicting values are made, the decision will be made with a full understanding of the "true value" lost or gained.

Implementing a More Comprehensive Approach

This volume presents a four-step approach or framework that integrates the science, the planning process, the regulatory and non-regulatory actions, and the different geographic scales at which natural resources should be managed. It represents the ideal situation where a local government has adequate resources and commitment to undertake this process. The available scientific information makes clear that the most effective way to protect wetland functions and values is to use a comprehensive, landscape-based approach. Addressing only some of the recommended actions, therefore, increases the risk that wetland functions and values will not be adequately protected. (See Chapter 10 for additional discussion of characterizing the risk of proposed solutions for protecting and managing wetlands.)

Although Ecology and Fish and Wildlife understand that not all local governments are currently in a position to implement the comprehensive program described in Volume 2, the entire process is presented so users can understand what information or tasks they are missing, and to help understand the tradeoffs being made and risks taken in the protection of wetland functions and values. At a minimum, local governments should adopt strong wetland regulatory programs until they can incorporate non-regulatory elements and landscape-based planning policies and zoning regulations.

In addition, transforming our approach to managing wetlands from a site-specific focus to a view of the broader landscape is a change of practice for local governments. It will most likely occur incrementally as local governments collect and analyze landscape-scale data and then incorporate that information into their various policies, plans, and regulations. We recognize that many jurisdictions will face a challenge in updating their development regulations to meet the state deadlines for GMA updates, even without incorporating a landscape perspective at this time. However, those jurisdictions that rely solely on regulatory programs to protect wetlands should adopt stringent regulations in order to minimize the risk that wetland functions will be lost until a landscape-based approach can be developed and implemented.

Working with Local Governments on Developing and Using Landscape Analysis

This document provides ideas on how to analyze the landscape as well as references for the various analysis methods that are available (in Chapter 5 and the associated appendices). One method for landscape analysis is being developed by Ecology. It provides suggestions on how to analyze landscape information (such as geology, soils, and water flow) for use in planning, developing protection measures, and identifying wetlands for restoration and preservation. Ecology's process for analyzing the landscape is illustrated in Appendix 5-C through the use of two examples where it has been applied, one in a small area and one in a larger geographic area.

Ecology's method for landscape analysis is being improved as it is applied in different jurisdictions. In addition, the methods are currently lacking in their analysis of wildlife habitat and corridors. This gap will be addressed next year as the Departments of Fish and Wildlife and Ecology work together to better include wildlife factors in the analysis.

Therefore, Ecology invites local governments to work with the agency to conduct landscape analyses and use the information to develop more effective approaches to protecting and managing the landscape and its wetlands. In this way, local governments can plan an important role in further developing an approach to landscape analysis.

1.3 Using Science to Protect and Manage Wetlands

“To be effective, the nation’s wetlands protection and management programs must anticipate rather than react. They should focus on future, not the present or the past; on effectively protecting the remaining resources and actively restoring or creating additional wetlands. They should anticipate needs and problems on the basis of rigorous analyses of regional resources, trends, stresses, and values. They should consider the whole, not just the individual parts.”

— The Conservation Foundation, *Protecting America’s Wetlands: An Action Agenda. The Final Report of the National Wetlands Policy Forum* (1988).

1.3.1 Ecological Principles to Consider

The Ecological Society of America has taken a lead in compiling and explaining scientific principles on managing natural resources, such as wetlands (Dale et al. 2000). The ecologist’s goal is to ensure that future decisions include the best scientific information available. The principles illustrate the need to take a more holistic, landscape approach to managing our natural resources. The principles and their implications in environmental decision-making are briefly summarized in Table 1-1.

Table 1-1. Ecological principles and their implications in making decisions about land use (adapted from Dale et al. 2000 to focus on wetlands rather than land use in general).

Ecological Principle	Implication for Managing Land Use in and around Wetlands
The type, intensity, and duration of disturbances are the major factors shaping populations and the ecosystem as a whole. Disturbances can occur at many different spatial and temporal scales.	Changes in land use that cause new disturbances are likely to cause changes in animal and plant populations and the functions of a wetland. We need to manage disturbances at the scale at which they occur. For example, the eutrophication of a wetland may be a result of disturbances throughout its watershed and this problem cannot be managed only within the wetland itself. Also, it is not possible to target a specific “end point” when creating or restoring wetlands because changes are continuous.
Ecological processes operate at many time scales, and ecosystems change through time.	The current state of a wetland is in part a consequence of historical conditions. Therefore, historical information may be needed to understand how a wetland will respond to disturbance. Managing wetlands to protect their valuable functions requires us to consider how ecological processes change through time both with and without the influence of human activities.
Some species have key, broad-scale effects on the ecosystem (keystone species).	The removal of keystone species can radically change the functions in a wetland and spread well beyond the boundaries of the wetland. Because the effects of keystone species are complicated and not fully understood, we cannot predict the effects on the ecosystem of changes in their numbers or distribution. For example, removing beavers from a river system has significant impacts on the biological diversity and flooding patterns of the entire watershed.

Ecological Principle	Implication for Managing Land Use in and around Wetlands
Local conditions strongly affect environmental functions at a site.	The position of a wetland in the landscape defines the functions it performs. Wetlands in a specific landscape position may perform only certain functions and at specific rates. We need to understand these local conditions when creating, restoring or enhancing wetlands so we do not “plan” for functions that the landscape will not support. For example, wetlands on slopes do not pond water. Creating a ponded wetland on a slope is not compatible with the position in the landscape, and maintaining this wetland will require constant management of the dikes and the outflow structure.
The size, shape, and location of different types of uplands around a wetland influence its functions.	An understanding of the surrounding landscape is needed to understand the implications of decisions made about an individual wetland.

The Ecological Society of America has also proposed guidelines for managers to use in considering the ecological impacts of their decisions about land use (including wetlands) (Dale et al. 2000). These guidelines, listed below, can be considered a checklist of factors to consider when making decisions about managing or protecting wetlands:

- Examine the impacts of local decisions in a regional context.
- Plan for long-term change and unexpected events.
- Preserve rare landscape elements, critical habitats, and associated species.
- Retain large contiguous or connected areas that contain critical habitats.
- Minimize the introduction and spread of nonnative species.
- Avoid or compensate for effects of development on ecological processes.
- Implement land use and land management practices that are compatible with the natural potential of the area.
- Avoid land uses that deplete natural resources over a broad area.

1.3.2 Challenges to Using the Science

Decisions by hearings boards and the courts have made clear that the requirement to “include the best available science in developing policies and development regulations to protect the functions and values of critical areas” is a substantive requirement, not merely a procedural one. (A review of hearings board and court cases that summarizes the key findings related to best available science, prepared by staff from the Department of Community, Trade and Economic Development and the state Attorney General’s office, is presented in Chapter 2.)

However, including scientific information within policies, plans, and regulations is challenging. One of the greatest difficulties is that the science doesn't provide a "bright line." Science rarely supplies us with precise solutions for protecting natural resources. For example, the scientific literature often reports on experiments that do not relate directly to managing the resource. The scientists who reviewed the literature for Volume 1 found few studies that actually documented the effectiveness of different ways for managing the wetland resource (see Volume 1, Chapters 5 and 6). Rather, most studies discuss the impacts of human activities on wetlands. Also, very few experiments demonstrate true cause-and-effect relationships. Many impacts of human activities are not well understood and can only be hypothesized based on correlations.

Furthermore, many experiments tend to be very site specific and may not be applicable outside the immediate geographic area where the experiments were performed. Some may be applicable only to other similar settings and others may be applicable to a wide range of settings.

As a result, recommendations based on scientific information are, to a large degree, extrapolations and syntheses of all the information collected. Therefore, many of the recommendations in this document represent the collective interpretations by the authors of Volume 2 on the findings of the scientific information and how it pertains specifically to Washington.

For example, the recommendation that a 200-foot buffer will adequately protect the wildlife habitat functions of high-quality wetlands of eastern Washington is not based on a specific scientific study. Rather it represents a synthesis of many studies (see Chapter 5 in Volume 1). These studies show that different species need different widths of buffers that range from 100 feet to more than 600 feet. Furthermore, very few studies have focused on the needs of wildlife in wetlands of eastern Washington. In order to provide general guidance, therefore, the authors and reviewers of this document were forced to make an informed decision on the size of a buffer needed to protect wildlife in eastern Washington. In the absence of information about the species actually using a wetland, it was judged that a 200-foot buffer would adequately protect wildlife in wetlands that provide good habitat and are well connected in the landscape.

1.4 Science and Risk Management

One of the major recommendations made in Volume 2 is that local jurisdictions should understand the risk to the wetland resource resulting from their decisions. The uncertainties of translating the science to specific protection measures, described above, is one of the reasons that local governments need to assess the risks. Using buffers again as an example, one might ask: *How wide of a buffer is wide enough?* The science does not say that a 100-foot buffer will protect a certain type of wetland, whereas a 95-foot buffer will not. Instead, scientific information on buffers clearly states that buffers are important, that they perform many functions that are critical to maintaining wetland functions, and that a wide range of buffer widths provides a wide range of benefits depending on a number of factors.

Therefore, answering the critical question *How wide a buffer is enough?* is largely an exercise in deciding how much risk is acceptable. A regulation that sets a 300-foot buffer around every wetland significantly reduces the risk to those wetlands from human activities in the immediate vicinity of the wetland. That regulation can be characterized as relatively “low risk.” On the other hand, a jurisdiction that decides they will provide a 50-foot buffer for all wetlands would have to characterize their action as “high risk” because a 50-foot buffer will not protect many wetland functions.

In this document, risk is addressed by tailoring the degree of protection to several factors that the scientific literature says are important. Continuing to use buffers as an example, one option presented in Volume 2 provides different buffer widths depending on the type of wetland and the functions it performs, as well as the type and intensity of adjacent land use. Risk characterization is discussed in detail in Chapter 10.

“Characterizing the risk” of decisions is also an important tool for improving approaches to wetland protection. Scientific data on the effectiveness of protection measures can be collected and used to monitor the success of wetland management. This information then provides an objective basis on which to revise management approaches (see Chapter 12 for more information on adaptive management).

In the end, decision-makers should consider the entire context of wetland protection and management when choosing the level of protection afforded to wetlands—from reducing impacts to wetlands through good planning and zoning based on landscape analysis, to non-regulatory approaches such as stewardship incentives and restoration programs.

1.5 Scope of Volume 2

Non-GMA Protection of Wetlands Is Not Addressed in Volume 2

The regulations and management programs implemented by federal, state, and tribal governments are not discussed in Volume 2 except where a mandate directs the action of local governments. For example, the definition of wetlands used by local governments is specified in state law (see Chapter 8).

Although it plays a vital role in local management and protection of wetlands, the Shoreline Management Act (SMA) is not covered in detail in this document. We refer readers to the new SMA guidelines which contain requirements for local governments to follow in developing policies and regulations to protect wetlands within shoreline jurisdiction. (For more information see the web site at: <http://www.ecy.wa.gov/programs/sea/SMA/index.html>)

The linkage between the landscape analysis required in the SMA guidelines and that discussed in this document is described in Chapter 7. The SMA guidelines include requirements for the inventory and analysis of ecosystem-wide processes. These requirements are consistent with the recommendations in Volume 2 for incorporating landscape analysis into local planning and protection efforts.

Vegetated Tidal Wetlands Are Addressed in Volume 2

The recommendations made in this document are not strictly limited to freshwater wetlands. Vegetated tidal wetlands (a subset of all tidal wetlands) are addressed specifically in the revised wetland rating system for western Washington because they were included in past versions of the method, even though the scientific information about them was not summarized in Volume 1. The scientific information on which recommendations for tidal wetlands were based is summarized in Appendix 8-A.

How “Values” Are Addressed in Volume 2

As discussed in Volume 1, wetland functions are the things that wetlands “do.” Society, however, does not necessarily attach value to all wetland functions. Value is usually associated with goods and services that society recognizes. For example, trapping sediments is a wetland function that improves water quality, and this is often valued by society. Not all of the environmental factors that control wetland functions or the functions themselves, however, are recognized or valued.

Sometimes what is valued is not what a wetland does but some other aspect of the wetland ecosystem that is considered important socially. For example, “recreation” is valued by society and is often called a function even though it is not something a wetland “does.” Other aspects of the wetland ecosystem that are valued and have been called functions include “education” and “aesthetic quality.” These “values” are sometimes referred to as “social functions” to separate them from functions based on environmental factors.

The social functions cannot be assessed or rated using the same methods used to assess functions based on environmental factors. Valuing social functions requires methods based on economic, sociologic, and psychological tools, rather than on ecology and other environmental sciences.

The issue of “values” arises in this document in two ways. First, the GMA mandates that local governments protect wetland functions and values. However, the GMA does not define these terms or differentiate between them. One can assume that the GMA intended that the term “values” includes such things as recreation, education, and aesthetics. The wetland function assessment methods and the rating systems developed by the state do not address the social functions/values of wetlands such as recreation, aesthetics, education, and so on. In addition, the social functions are not part of the landscape analysis that is discussed in Chapter 5.

Second, “values” are also opinions held by communities in regard to what is important to them. For example, a community or rural area might value one wetland function more than another. Water quality improvement might be more valued than flood control in an area with water quality problems if that community is not in an area prone to flooding. In addition, a community might value certain amenities in their neighborhoods or rural areas above others. For example, a community might value keeping the maximum amount of vegetated area through clustered development more than scattered development that fragments vegetation. The need to identify and consider these values is addressed in Chapters 6 and 7. The landscape analysis offered in Chapter 5 provides important

information needed to make decisions regarding what is valued and what communities, and their wetlands, will be like in the future.

1.6 Process of Developing Volume 2

Production of this document (Volume 2) and Volume 1 was funded through a grant from the U.S. Environmental Protection Agency. Attendees of two focus groups provided early direction for the volumes. Meetings of focus groups were held in Olympia and Moses Lake in early 2002 to solicit ideas for the scope and objectives of the project. This information was used to guide the development of both volumes. These focus groups were attended by over 60 individuals, primarily representatives from local governments and consulting firms.

The guidance contained in Volume 2 was developed by a team of staff members from agencies and consulting firms using the synthesis of the science in Volume 1. The team (called the Core Team) consists of staff from the Washington State Departments of Ecology; Fish and Wildlife; Community, Trade and Economic Development; Sheldon & Associates; and a contract editor. A list of the members of the Core Team is provided in Appendix 1-A.

The Core Team developed the guidance in conjunction with a team of local government staff. The members of the Local Government Wetlands Advisory Team (LGWAT) are also listed in Appendix 1-A. LGWAT was convened in December 2003 to provide ongoing input and guidance to the development of this volume. This group met several times to review and respond to draft concepts and materials developed by the Core Team. Additionally, meetings were held with representatives from the business and environmental communities to solicit their ideas and comments on concepts and early draft documents.

Volume 2 was written by several members of the Core Team. Various sections, chapters, and appendices, therefore, have different primary authors. Editors revised the text into a coherent whole.

Opportunities for Comment and Process for Finalizing Volume 2

The draft of Volume 2 is being distributed for review during a four-week period to solicit comments. It is being provided to all those who have requested a hard copy, or a CD, or who can download it from the project's web page. In July, a newsletter was sent to the project's mailing list of over 1,200 recipients, informing them of the upcoming review period. They were requested to inform Ecology if they wanted to review the draft and needed to receive it in hard copy or CD format. For all those for whom we have an address, an email will be sent when the document has been posted on the project's web site.

Instructions are provided with this volume to inform reviewers about the process for submitting comments. Please read the instructions carefully before providing your

review. The agencies are requesting a critique of the general guidance and specific recommendations as well as feedback on suggested additions to the document. Comments regarding organization and ease of reading are also welcome.

After comments have been submitted and organized, the Core Team will review them and revisions will be made. Once completed, sometime in the fall of 2004, Volume 2 will be released in its final form.

1.7 How to Use Volume 2

Local governments are encouraged to read and understand the entire document before determining how they want to protect wetland functions and values. Although we provide a brief summary of Volume 1 in Chapter 3 of this document, we highly recommend reading Volume 1 as well, especially key points and conclusions.

We recognize that many local governments will want to rely largely on a regulatory approach to protecting wetlands and will be inclined to skip over the recommendations related to using a landscape approach to understanding and protecting wetlands, as well as the non-regulatory elements. However, we believe the key message from the scientific literature is that reliance upon a strictly regulatory, permitting approach will fail to adequately protect wetland functions and values.

Citations in the Text

This document is not intended to be a scientific treatise and, in general, does not reference specific scientific literature. While Chapter 3 provides an overview of the scientific basis for the recommendations in this document, the more detailed, peer-reviewed and referenced information on wetland science is contained in Volume 1. Also, many of the recommendations in this document cannot be tied to a specific scientific article, and cannot be cited as such (or the list of citations would be extremely long and cumbersome). Citations therefore are provided only when a specific recommendation was also made within the scientific literature. Some additional literature sources are cited in Chapter 6 and elsewhere in other parts of Volume 2. Many of these are not strictly scientific in nature and therefore were not included in the synthesis of the science in Volume 1.

As mentioned previously, the guidance provided in Volume 2 is advisory only. The Growth Management Act does not require that local governments adopt the protection standards recommended in this document. Local governments are free to use or adapt the options and recommendations presented here or develop entirely different approaches to protecting wetlands to fit their particular circumstances.

1.8 How Volume 2 Is Organized

Volume 2 is organized into 12 chapters plus references and appendices. The first three chapters in this document explain the purpose, legal basis, and basic scientific foundation for the recommendations that follow. Chapter 4 outlines a suggested framework that local governments can follow to protect and manage wetlands. The remaining chapters, Chapters 5-12, describe the primary elements of this framework. Methods for analyzing the resource, recommended language for plans and codes, and various supporting information are provided in the appendices.